

Application No. 10/813,117
Amendment dated May 29, 2007
After Final Office Action of February 26, 2007

Docket No.: 21064/1206589-US1

AMENDMENTS TO THE CLAIMS

LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A magnetic recording medium comprising a substrate, an interlayer and a magnetic layer, the interlayer comprising at least a first intermediary layer, a second intermediary layer and a third intermediary layer, wherein the first intermediary layer or the third intermediary layer is non-magnetic and the second intermediary layer has a hexagonal close pack crystal structure and a property of providing RKKY coupling between the first intermediary layer and the third intermediary layer when the first intermediary layer and the third intermediary layer are magnetic layers,

wherein the magnetic layer comprises (a) a Cr-rich layer comprising Cr and (b) a Cr-dilute layer comprising Cr, wherein the Cr-rich layer comprises a greater atomic percent Cr than the Cr-dilute layer.

2. (Currently amended) The medium of claim 1. A magnetic recording medium comprising a substrate, an interlayer and a magnetic layer, the interlayer comprising at least a first intermediary layer, a second intermediary layer and a third intermediary layer, wherein the first intermediary layer or the third intermediary layer is non-magnetic and the second intermediary layer has a hexagonal close pack crystal structure, wherein the first intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

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3. (Original) The medium of claim 2, wherein the third intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

4. (Original) The medium of claim 3, further comprising a non-oxidized or oxidized NiP or CoW layer on the substrate.

5. (Currently amended) The medium of claim ~~1~~2, wherein the magnetic layer comprises CoCr or an alloy of CoCr with at least one element selected from the group consisting of Pt, Ta, B, Mo, Ru, Si, Ge, Nb, Fe, Ni, Cu, Ag, Au and combinations thereof.

6. (Canceled)

7. (Currently amended) The medium of claim ~~1~~2, wherein the first intermediary layer has a thickness of less than 1 nm and the second intermediary layer has a thickness of about 0.01 to 3 nm.

8-13. (Canceled)

14. (Currently amended) A method of manufacturing a magnetic recording medium comprising depositing an interlayer on a substrate and depositing a magnetic layer on the interlayer,

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the interlayer comprising at least a first intermediary layer, a second intermediary layer and a third intermediary layer, wherein the first intermediary layer or the third intermediary layer is non-magnetic and the second intermediary layer has a hexagonal close pack crystal structure and a property of providing RKKY coupling between the first intermediary layer and the third intermediary layer when the first intermediary layer and the third intermediary layer are magnetic layers,

wherein the magnetic layer comprises (a) a Cr-rich layer of CoCr or CoCr with one or more elements selected from the group consisting of Pt, Ta, B, Mo, Ru, Si, Ge, Nb, Fe, Ni, Cu, Ag, Au, where in Cr concentration is greater than or equal to 17 atomic %, and (b) a Cr-dilute layer of CoCr or CoCr with one or more elements selected from the group consisting of Pt, Ta, B, Mo, Ru, Si, Cu, Ag, Ge, Nb, Fe, Ni, Au, where in Cr concentration is less than 17 atomic %.

15. (Original) The method of claim 14, wherein the first intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Cu, Ag, Au, and combinations thereof, and further wherein the third intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Cu, Ag, Au, and combinations thereof.

16. (Canceled)

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17. (Original) The method of claim 14, wherein the first intermediary layer has a thickness of less than 1 nm and the second intermediary layer has a thickness of about 0.01 to 3 nm.

18-20. (Canceled)

21. (Currently amended) The medium of claim 1, wherein the second intermediary layer has having a hexagonal close pack crystal structure and comprises a material selected from the group consisting of Ru, Re and alloys thereof.

22. (Currently amended) ~~The medium of claim 21,~~ A magnetic recording medium comprising a substrate, an interlayer and a magnetic layer, the interlayer comprising at least a first intermediary layer, a second intermediary layer and a third intermediary layer, wherein the first intermediary layer or the third intermediary layer is non-magnetic and the second intermediary layer has a hexagonal close pack crystal structure, wherein the second intermediary layer further comprises at least one bcc-structured element selected from the group consisting of W, Mo, Ta, Nb, Cr, and V.

23-24. (Canceled)

25. (Currently amended) The medium of claim 1, wherein the second intermediary layer has having a hexagonal close pack crystal structure and comprises Ru or a Ru alloy that consist of

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over 80 at. % of Ru and the rest of elements selected from the group consisting of Ti, V, Cr, Zr, Nb, Mo, Rh, Hf, Ta, W and Ir.

26. (Canceled)

27. (New) A magnetic recording medium of claim 1 wherein the magnetic layer comprises (a) a Cr-rich layer of CoCr or CoCr with one or more elements selected from the group consisting of Pt, Ta, B, Mo, Ru, Si, Ge, Nb, Fe, Ni, Cu, Ag, Au, where in Cr concentration is greater than or equal to 17 atomic %, and (b) a Cr-dilute layer of CoCr or CoCr with one or more elements selected from the group consisting of Pt, Ta, B, Mo, Ru, Si, Cu, Ag, Ge, Nb, Fe, Ni, Au, where in Cr concentration is less than 17 atomic %.

28. (New) The medium of claim 27, wherein the first intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

29. (New) The medium of claim 27, wherein the second intermediary layer has a hexagonal close pack crystal structure and comprises a material selected from the group consisting of Ru, Re and alloys thereof.

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30. (New) The medium of claim 27, wherein the third intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

31. (New) The medium of claim 1, wherein the first intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

32. (New) The medium of claim 1, wherein the second intermediary layer having a hexagonal close pack crystal structure comprises a material selected from the group consisting of Ru, Re and alloys thereof.

33. (New) The medium of claim 1, wherein the third intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

34. (New) The medium of claim 21, wherein the first intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from

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the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

35. (New) The medium of claim 21, wherein the second intermediary layer having a hexagonal close pack crystal structure comprises a material selected from the group consisting of Ru, Re and alloys thereof.

36. (New) The medium of claim 21, wherein the third intermediary layer has a hexagonal close pack crystal structure and comprises Co or a Co alloy with at least one element selected from the group consisting of Cr, Pt, Ta, B, Ti, Zr, Hf, Mo, Ru, Si, Ge, Nb, Fe, Ni, Ag, Au and combinations thereof.

37. (New) The medium of claim 29, wherein the second intermediary layer further comprises at least one *bcc*-structured element.

38. (New) The medium of claim 32, wherein the second intermediary layer further comprises at least one *bcc*-structured element.

39. (New) The medium of claim 35, wherein the second intermediary layer further comprises at least one *bcc*-structured element.

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40. (New) The medium of claim 37, wherein the at least one *bcc*-structured element selected from the group consisting of W, Mo, Ta, Nb, Cr, and V.

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